IV. AMENDMENTS TO THE CLAIMS

1. (Original) A radiation detector for detecting a spatial distribution of incident radiation, comprising:

a radiation-sensitive semiconductor;

a common electrode formed on one surface of said semiconductor for receiving a bias voltage;

a plurality of split electrodes formed on the other surface of said semiconductor for outputting, as electric signals, charges generated within said semiconductor by the incident radiation; and

a light irradiating mechanism for emitting light at least during a detection of the radiation.

2. (Original) A radiation detector as defined in claim 1, wherein said light has a wavelength shorter than a wavelength corresponding to a band gap energy of said semiconductor used.

3. (Original) A radiation detector as defined in claim 1, wherein said light has a wavelength shorter than a wavelength that halves a transmittance of said semiconductor used, and longer than a wavelength corresponding to a band gap energy of said semiconductor.

4. (Original) A radiation detector as defined in any one of claims 1 to 3, wherein said semiconductor comprises an amorphous material selected from non-dope selenium or non-dope selenium compound, selenium or selenium compound doped with As or Te, selenium doped with an alkali metal, a selenium compound doped an alkali metal, selenium doped with a halogen, a selenium compound doped with a halogen, and selenium or selenium compound doped with a combination of As, Te, an alkali metal and a halogen.

5. (Original) A radiation detector as defined in any one of claims 1 to

3, wherein said semiconductor comprises a polycrystalline material selected from compound semiconductors such as CdTe, CdZnTe, PbI_2, HgI_2, TlBr and GaAs, and said compound semiconductors doped with a halogen.

6. (Original) A radiation detector as defined in any one of claims 1 to 3, wherein said light irradiating mechanism includes planar light guide means, and linear light emitting means attached to some ends of said planar light guide means.

7. (Original) A radiation detector as defined in claim 6, wherein said planar light guide means includes a light diffusing sheet, a light reflecting sheet, and a transparent plate interposed therebetween, said light diffusing sheet being disposed opposite said split electrodes.

8. (Original) A radiation detector as defined in claim 6, wherein said linear light emitting means is a direct light emitting device for directly radiating light of a particular wavelength.

9. (Original) A radiation detector as defined in claim 6, wherein said linear light emitting means is an indirect light emitting device combined with a phosphor for indirectly radiating light of a particular wavelength according to said phosphor.

10. (Original) A radiation detector as defined in any one of claims 1 to 3, wherein said light irradiating mechanism includes planar light emitting means.

11. (Original) A radiation detector as defined in claim 10, wherein said planar light emitting means comprises a direct light emitting device arranged in a plane for directly radiating light of a particular wavelength.

12. (Original) A radiation detector as defined in claim 10, wherein said planar light emitting means is formed directly on a transparent substrate.

13. (Original) A radiation detector as defined in claim 10, wherein said planar light emitting means comprises an indirect light emitting device combined with a phosphor for indirectly radiating light of a particular wavelength according to said phosphor.

14. (Original) A radiation detector as defined in claim 13, wherein said planar light emitting means has a substrate acting as a light emitting surface thereof, said split electrodes being formed on an upper surface of the said planar light emitting means, said semiconductor being formed over said split electrodes.

15. (Original) A radiation detector for detecting a spatial distribution of incident radiation, comprising:

a radiation-sensitive semiconductor;

a common electrode formed on one surface of said semiconductor for receiving a bias voltage;

a plurality of split electrodes formed on the other surface of said semiconductor for outputting, as electric signals, charges generated within said semiconductor by the incident radiation;

a carrier selective intermediate layer formed at least between said semiconductor and said split electrodes; and

a light irradiating mechanism for emitting light at least during a detection of the radiation.

16. (Original) A radiation detector as defined in claim 15, wherein said light has a wavelength shorter than a wavelength that halves a transmittance of said intermediate layer.

17. (Original) A radiation detector as defined in claim 16, wherein said light has a wavelength shorter than a wavelength that reduces the transmittance of said intermediate layer to 10%.

18. (Original) A radiation detector as defined in any one of claims 15 to 17, wherein said intermediate layer comprises an amorphous material selected from non-dope selenium or non-dope selenium compound, selenium or selenium compound doped with As or Te, selenium doped with an alkali metal, a selenium compound doped an alkali metal, selenium doped with a halogen, a selenium compound doped with a halogen, and selenium or selenium compound doped with a combination of As, Te, an alkali metal and a halogen.

19. (Original) A radiation detector as defined in any one of claims 15 to 17, wherein said intermediate layer comprises a polycrystal of one of compound semiconductors of Sb_2S_3, CeO_2, CdS, CdSe, CdTe, CdZnTe, ZnSe, ZnTe, ZnS, PbI_2, HgI_2, TlBr and GaAs, one of said compound semiconductors doped with a halogen, or a combination of said polycrystals forming multiple layers.

20. (Original) A radiation detector as defined in claim 18, wherein said semiconductor comprises an amorphous material different from said intermediate layer and selected from non-dope selenium or non-dope selenium compound, selenium or selenium compound doped with As or Te, selenium doped with an alkali metal, a selenium compound doped an alkali metal, selenium doped with a halogen, a selenium compound doped with a halogen, and selenium or selenium compound doped with a combination of As, Te, an alkali metal and a halogen.

21. (Original) A radiation detector as defined in claim 19, wherein said semiconductor comprises an amorphous material selected from non-

dope selenium or non-dope selenium compound, selenium or selenium compound doped with As or Te, selenium doped with an alkali metal, a selenium compound doped an alkali metal, selenium doped with a halogen, a selenium compound doped with a halogen, and selenium or selenium compound doped with a combination of As, Te, an alkali metal and a halogen.

22. (Original) A radiation detector as defined in claim 19, wherein said semiconductor comprises a polycrystalline material different from said intermediate layer and selected from compound semiconductors such as CdTe, CdZnTe, PbI_2, HgI_2, TlBr and GaAs, and said compound semiconductors doped with a halogen.

23. (Original) A radiation detector as defined in claim 15, wherein said intermediate layer is formed at least between said semiconductor and said split electrodes by using a material having a threshold wavelength of transmittance between a wavelength that halves a transmittance and a wavelength corresponding to a band gap energy of said semiconductor.

24. (Original) A radiation detector as defined in claim 23, wherein said semiconductor comprises an amorphous material selected from non-dope selenium or non-dope selenium compound, selenium or selenium compound doped with As or Te, selenium doped with an alkali metal, a selenium compound doped an alkali metal, selenium doped with a halogen, a selenium compound doped with a halogen, and selenium or selenium compound doped with a combination of As, Te, an alkali metal and a halogen, and said intermediate layer comprises a polycrystal of one of compound semiconductors of Sb_2S_3, CeO_2, CdS, CdSe, CdTe, CdZnTe, ZnSe, ZnTe, ZnS, PbI_2, HgI_2, TlBr and GaAs, one of said compound semiconductors doped with a halogen, or a combination of said polycrystals forming multiple layers.

25. (Original) A radiation detector as defined in any one of claims 15

to 17, 23 and 24, wherein said light irradiating mechanism includes planar light guide means, and linear light emitting means attached to some ends of said light guide means.

26. (Original) A radiation detector as defined in claim 25, wherein said planar light guide means includes a light diffusing sheet, a light reflecting sheet, and a transparent plate interposed therebetween, said light diffusing sheet being disposed opposite said split electrodes.

27. (Original) A radiation detector as defined in claim 25, wherein said linear light emitting means is a direct light emitting device for directly radiating light of a particular wavelength.

28. (Original) A radiation detector as defined in claim 25, wherein said linear light emitting means is an indirect light emitting device combined with a phosphor for indirectly radiating light of a particular wavelength according to said phosphor.

29. (Original) A radiation detector as defined in any one of claims 15 to 17, 23 and 24, wherein said light irradiating mechanism includes planar light emitting means.

30. (Original) A radiation detector as defined in claim 29, wherein said planar light emitting means comprises a direct light emitting device arranged in a plane for directly radiating light of a particular wavelength.

31. (Original) A radiation detector as defined in claim 29, wherein said planar light emitting means is formed directly on a transparent substrate.

32. (Original) A radiation detector as defined in claim 29, wherein said planar light emitting means comprises an indirect light emitting device

combined with a phosphor for indirectly radiating light of a particular wavelength according to said phosphor.

33. (Original) A radiation detector as defined in claim 32, wherein said planar light emitting means has a substrate acting as a light emitting surface thereof, said split electrodes being formed on an upper surface of the said planar light emitting means, said semiconductor being formed over said split electrodes.

34. (Original) A radiation detector as defined in any one of claims 1 to 3, 15 to 17, 23 and 24, wherein said semiconductor is formed on a TFT substrate having thin film transistor switches, charge storage capacitors and said split electrodes formed on a transparent substrate.

35. (Original) A radiation detector as defined in claim 34, wherein said split electrodes are transparent or translucent to said irradiating light.

36. (Original) A radiation detector as defined in any one of claims 15 to 17, 23 and 24, wherein said semiconductor and said intermediate layer are formed on a TFT substrate having thin film transistor switches, charge storage capacitors and said split electrodes formed on a transparent substrate.

37. (Original) A radiation detector as defined in claim 36, wherein said split electrodes are transparent or translucent to said irradiating light.

38. (Original) A radiation detector as defined in any one of claims 1 to 3, 15 to 17, 23 and 24, wherein said light irradiating mechanism is controlled by an on/off switch to emit light.

39. (Original) A radiation detector as defined in claim 38, wherein light emission from said light irradiating mechanism is controlled by a control

unit.

40. (Original) A radiation detector as defined in claim 39, wherein said control unit controls said light irradiating mechanism to emit light continuously or in pulse irrespective of an incidence of radiation.

41. (Original) A radiation detector as defined in claim 39, wherein said control unit controls said light irradiating mechanism to emit light only during an incidence of radiation.

42. (Original) A radiation detector as defined in claim 39, wherein said control unit controls said light irradiating mechanism to emit light immediately after cessation of an incidence of radiation until a next incidence of radiation.